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The Virtual Classroom

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Abstract
The process of undertaking educational classes or programs remotely from schools, campuses or physical institutions that provide them has become revitalized through the application of the internet as a means of communication. Real time online teaching offers at least the same level of effectiveness as traditional classes or workshops, but at a fraction of the costs. The success of training in the virtual classroom depends on the efficiency of the hardware and software platform as well as capabilities of the teacher to control and communicate via the platform.

1. Introduction
Distance Learning, i.e. "the process of undertaking educational classes or programs remotely from schools, campuses or physical institutions that provide them" [2], has become revitalized through the application of the internet as a means of communication. Therefore, Distance Learning is now also known as "Online Learning" or "elearning"[1] [2].

A recent issue of Newsweek brings three showcases of Distance Learning [2] arguing that Distance Learning allows you to obtain online qualifications wherever you are and whatever your schedule. This is what we will call "asynchronous elearning"**.** One of the showcases describes a highly interactive program; however from the webpage neither this program seems to be based on so-called "synchronous elearning".

Asynchronous learning is a learning event where interaction between teacher and students occurs intermittently with a time delay. Examples are self-paced courses taken via the internet or CD-ROM, online discussion groups (usually through Bulletin Board Systems, BBS), and email. Thus, asynchronous learning is today's variation of the classic letter course, which enlists the computer in the teaching process. [3]

[1] "elearning" is spelled in several other ways; "eLearning", " e-learning", and "E-learning". We have selected the spelling recently used by Newsweek.

Synchronous learning is a real-time, instructor-led online learning event in which all participants are logged on at the same time and communicates directly with each other. [3]

In the year 2000 a report was prepared by the American Senate headed by senator Bob Kerry [1] pointing out three major problems related to education;

1. Not enough money is spent on educational research
2. Educational research often does not support enhanced learning performance
3. Educational research often is not accessible to teachers or easily translated into practice

This report had a major influence on the development of online education at The Technical University of Denmark (DTU) as it inspired the first author to make his own experiences. Especially Bob Kerry's statements regarding the quality of research results from the many research activities in didactics emerging through the years without having any positive impact on the proliferation of learning made an impression.

Thus, in late 2003 two Departments at the DTU, Department of Management and Production and the Department of Civil Engineering, established an independent organisation, the "E-Learning Consortium", with the purpose of securing a solid platform for online education as well as carrying out the necessary education and training of future web-educators. In addition the E-Learning Consortium was to provide research funds for new initiatives in the field of elearning.

To reflect the wider perspectives of the platform, i.e. on-line web-based communication in global industrial organisations in addition to teaching, the activities of the E-Learning-Consortium were recently moved to an independent company, KnowledgeComm ApS[2], located at DTU.

DTU has extensive experience with on-line elearning, including education of MSc-students in fundamental theories, individual learning activities for employees in industrial companies and interest groups, which require cost-effective and application oriented, operational learning, lecturing at meetings and conferences, and project meetings. As a European pioneer of on-line elearning, KnowledgeComm ApS participates in the ongoing development of the American state-of-the-art software platform.

This paper deals with the platform for synchronous elearning and the education of web-educators established at DTU.

[2] KnowledgeComm ApS offers web-instructor education, leasing of virtual rooms and consultancy in web-based communication, see http://www.knowledgecomm.org/. The actual elearning courses are offered by DTU professors and others.

2. Platform for synchronous elearning

Synchronous elearning platforms can facilitate learning sessions, which offer at least the same level of effectiveness as traditional classes or workshops, but at a fraction of the costs. The students are simply connected to the virtual classroom via a normal ADSL-line.

The possibilities are almost without limitations:

- Students can select long distance learning from the best universities with the most relevant courses and best teachers and thereby plan an optimal education
- Employees in companies with many geographical locations can work together on shared projects and development of common competencies
- Interest groups can collaborate on learning activities, independent of location.

A platform for synchronous elearning shall allow real-time on-line two-way communication between lecturer and students. In this **virtual classroom** setting, the instructor or a moderator maintains control of the class, with the ability to "call on" participants. In most platforms, students and teachers can use a whiteboard to see work in progress and share knowledge. Interaction may also occur via audio- or videoconferencing, VoIP or Webcasts. Newest forms include application sharing, where participants can collaborate in using the same software. [3]

After extensive research of various platforms the American Hotcomm-system based in Boston was selected as the educational platform. Reasons were numerous, but among the most important was that the dialogue and support were extremely good in spite of the distance. In addition the cost of establishing a server based in Denmark wasn't in any way prohibitive in order for the use to have the necessary capacity to explore the potential and interest at DTU.

3. Training of web-educators

It soon became apparent that a lot of the experiments in synchronous elearning outside DTU were based on random platforms, lack of technical insight, lack of understanding of the weak points of the software and poor abilities to work out academically competent educational material for use on the software platforms.

Education on the internet through synchroneous methods is a very demanding task. It is far more complex for the educator to communicate like this than by traditional means such as in a class or auditorium. It demands a higher degree of preparation, plan of instruction, and carefully prepared teaching materials.

If one is to compare it to other media, then this method of teaching has several similarities with communication of knowledge via audiovisual media such as TV. Actually one can regard the teacher as being a "host" on a TV-Station.

The reason for the limited profit was more a problem based on a lack of understanding of the multidisciplinary technique in didactics, phonetics, and academic competence required rather

than the educational potential of the medium. Thus, a program for training of future web-educators was set up.

The practical implementation of the program has been an interaction between the three elements of the course; 1) technical aspects of the software, 2) phonetics (verbal communication technique), and 3) digital presentation technique, supplemented with practical training (Combination of 1, 2, and 3).

The present training of web-educators at DTU is primarily offered to persons with acknowledged teaching experience. They have to have demonstrated teaching potential in the form of good student evaluations as well as a commitment to teaching. A new group of partners from the hi-tech industry has already agreed on participating in the training of web-educators, realizing the unique possibility of employing this technology in the technical training of staff in far-away destinations.

3.1 Training the technical aspects of the software

The training program is initiated by an introduction to the use of the software. A small group of participants is placed in the same room so that both the person who is acting as teacher and those acting as students is able to view both screens simultaneously.

Many computers these days have a graphics card which enables the connection of two monitors at the same time – by attaching a long cable to one of the monitors it is possible to have a bit of distance in order to give the teachers computer some distance and privacy from the students.

This is done so that the teacher can view the consequences of his/her actions and thereby learn the basic operating procedures of the software and its application in an actual dynamic educational environment. It is expected that the participants during the course of this module is acquainted with use of the chat-system, web-camera, audio recording facilities, the digital whiteboard, shared internet surfing and application sharing in general. The future web-educators are strongly advised to “play” with the software at home, in order to maximize their familiarity with it. Obviously the participants taking part in the training program take turns in acting as the teacher.

3.2 Training phonetics

After the training in the technical aspects the participants takes part in a brief, but intensive training in phonetics (proper speech), didactic and the problems associated with teaching online. The goal of this part is to allow the web-educator to keep his/her style of teaching, but to adapt it to this new medium. The web-educator has to be trained to be self-assured in the educational situation both mentally and psychologically.

The verbal communication part of the course is based in learning how to control the basic functions in voice, speech and breath in order to avoid that the teachers own verbal communication skills is a hindrance for the communication in the virtual classroom. The basic functions, which we focus on, are:

- Placement of the voice
- Tempo of the speech
- Breathing
- Diction/language
- Communication skills (modulation, phrasing).

3.3 Training in digital presentation technique

The third part of the course contains directions on how to prepare the optimal digital presentation on the internet and in the virtual classroom. A particular focal point is the design of overheads or slides. In the near future even video transmission over the platform will be possible. It is important to have a solid knowledge, since presentation material is often unsuitably designed.

The method we use here is simply a demonstration of what to do and what not to do in order to make the teacher aware of some of the possible pitfalls. Many trained educators already have a firm grasp of this and only need little help, but some of the animations and effects commonly used are currently not suited for use online. Limitations in bandwidth and other technicalities make it impractical to employ all the features of the modern presentational software. It is important that the web-educator is aware of the limitations of the software used in the educational situation.

3.4 Practical training

The training is finalized with practical training, where the future web-educators have to combine all the disciplines of the previous lessons. Each of the participants has to prepare a series of lectures in his/her field. The aim is to focus on the didactic part while practicing the technology, the phonetics, and the digital presentation technique.

The lectures primarily take place on the university campus, but could easily take place from other geographical locations. During the lectures several PC's are connected. The web-educator is physically separated from the other participants. More participants can follow the lecture on a projector. The participants are required to follow lectures both as a teacher and as a student since it is important that the web-educators gain insight in both roles of the educational experience. This also develops the technical skills of the web-educators and enables them to improve their online teaching skills. At this moment in time synchronous online education is still in its infancy and in the foreseeable future we are considered pioneers in the field. The teaching sessions are evaluated on a scientific, didactic, and phonetic level.

3.5 Test and certificate

When the web-educator is deemed to have reached an appropriate level of expertise, the KnowledgeComm ApS at DTU offers a one-hour test judged by a group of experts in speaking, education and IT –specialists.

The test is an online synchronous elearning lecture on a subject chosen by the candidate himself/herself. The web-educator may choose to demonstrate his/her abilities acting also as a moderator for someone else, by inviting another web-educator. The educational experience has to be arranged so that the academic judge is actively drawn into the session to demonstrate a certain degree of improvisation during the lecture for instance by co-operating on a task on the digital white-board.

The test should reflect that suitable skills in operating the software have been obtained that the phonetic and digital presentation has a quality that ensures an optimal communication of the subject and that the web-educator is able to activate the students. If the evaluating judges decide that the test is successfully completed, KnowledgeCom ApS will issue a certificate that enables the web-educator the right to offer academic courses on the software platform made available by the KnowledgeCom ApS at DTU.

4. Concluding remarks

Experiences so far can be summed up like this;

- The industry and the industrial organizations in Denmark, among which is the Danish Engineering Association (IDA), wholly support the idea. The following citations illustrate this;
  - "Lecturers are trained as TV stars. The University has developed its own concept for a second generation elearning, which can be compared to a direct TV transmittance" [5]
  - "A concept, which may facilitate Danish industry's future competitiveness - to collaborate effectively on development and delivery of the products the customers request" [6]
  - "The companies requests flexible, effective and modular based in-service training, which makes it possible to learn according to needs and at times when it does not interfere with the daily work. Here real time elearning may be the decisive factor." [7]
- Off course there have been technical problems in the establishment of the platform. Such problems have been solved in cooperation with the software developer. In the foreseeable future new problems will emerge, while the technology is new. This is a law of nature when one is a pioneer in a field. – It is important that the problems are tackled professionally in order to distinguish between software development and actual application problems so that they can be solved in dialogue between the developer and the user. As of now the software is sufficiently advanced for the newly trained web-educators to enable them to offer quality education in complex theoretical academic courses on the Internet.
- The educators are very committed and several have already established web-courses.
- Interested students and colleagues surrounding the core of the elearning group have also contributed to the unique knowledge gathered about synchronous elearning. It has only been by the constant experiments in the academic environment and with the educators as principle actors and constructive critics, that it has been possible to create useable results. Quality elearning probably cannot be created outside of environments where education is a central activity.

- The learning efficiency obtained through synchronous elearning is very high, and the students find the medium most inspiring and challenging. One can spend a few hours in front of the computer at home or at work without having to travel or be absent from normal work, supporting the future objectives of learning: On location, on demand, on-line, just in time.

Aknowledgements

The section on training phonetics is based on work by Dan Sclosser given in [4].

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